

ART. XI. *On the Pathological or Abnormal State of the Circulation.*

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THE circulation, executed by a complex apparatus diffused throughout the organism, and entering into the mode of being of every organ, is necessarily exposed to suffer frequent and varied derangements. A large proportion of the disorders of the economy attaches to some irregularity in the circulation, either limited to particular organs; or involving, to various extent, the whole of the function. It is not our design here, to enter into the particular details of all the diversities of functional disturbances manifested by the circulation, but merely to indicate the general character of the most important, and the causes of their production.

The circulation may be thrown into an abnormal state, 1st, by the quantity or quality of the circulating nutritive fluid; and 2d, by a pathological condition of the various organs by which it is executed.

Of the Blood as Affecting the Circulation.—Plethora or hyperemia gives a force and energy to the circulation by the excessive stimulation of the blood, and fulness of the vessels, that often passes into a pathological state. The functions of the heart, of the brain, and other organs, are irregularly exercised, hæmorrhages are induced, and apoplexies, and various diseases of repletion and excitation, are attendants on this state.

A reverse condition awakens also pathological phenomena not less numerous. The sudden diminution of the quantity of the blood by hæmorrhage or venesection, produces very considerable disorders in the circulation, and disturbances in the functions of different important organs. After the first impression of exhaustion, a species of reaction ensues, which may easily be, and most probably not unfrequently is, mistaken for excitement. The action of the heart is quickened, palpitations are excited; the pulse is frequent, and exhibits often a deceptive fulness. With this state of the circulation there also frequently exist distressing and confused sounds in the head, throbbing, and other unpleasant sensations, sometimes delirium, with nervous pains in various parts similar to those of inflammation, oppression of the chest, and difficult respiration.

The feebleness of the pulse, even when full, the palor, relaxation, coolness, and moisture of the skin, the sense of exhaustion and sink-

ing experienced by the patient, are circumstances that indicate the true character of this condition, and will guard an attentive observer against the dangerous error of mistaking it for an active inflammatory excitement, which it in part simulates, requiring depletion. Dr. MARSHALL HALL has written professedly on this state, the consequence of undue depletion, but he may be suspected of pushing his favourite doctrine too far, and of seeing exhaustion from depletion where it truly does not exist. The irregularity of the capillary excitement, and distribution of its circulation, such as attends on extreme congestions, in which some organs are oppressed by repletion, and the functions of others are nearly suspended by the diminution of their circulatory actions, exhibit many of the symptoms he attributes to general exhaustion from loss of blood. Some of his cases are of this character.

The deficiency of colouring matter and of fibrin in the blood, is productive of trains of symptoms precisely similar to those proceeding from excessive losses of blood. The absence of these principles is not an unfrequent occurrence in the course of chronic diseases of the digestive and respiratory organs, especially in those of the lymphatic temperament, in protracted intermittents, and occasionally takes place without any assignable cause. This defective state of the red globules is characterized, in addition to the preceding symptoms, by the bombycinous aspect of the skin, the bloodless hue of the mucous tissue of the mouth, tongue, fauces, and of the lips, disposition to anasarcaous swellings, extreme lassitude, and incapacity for active exertions.

The brain and nervous system generally appear more especially to suffer, and to experience great disorder of their functions, from sudden deperditions of the sanguineous humour, and defective hematosiis, when this last occurs rapidly. Paralysis has frequently been an immediate result of excessive detractions of blood. It is most probable that the disturbances of the circulatory functions induced by excessive losses of blood, are a consequence of the disorder into which the functions of the nervous system are thrown.

It is scarcely possible to explain satisfactorily the immediate cause of this disordered state of the nervous functions. Our ignorance of the nature of the nervous phenomena; and of their production, must render such attempts, if not entirely, at least, for the most part, nugatory. The following rationale is proposed as an approach to a solution of the problem. A particular constitution of organs, which, in a limited range, constitutes their natural or healthy mode of being, is essential to the regular and natural exercise of their functions. A

certain quantity of the sanguine nutritive humour, or oxygenated blood, definite for each organ, is indispensable to this constitution of the organs. This proportion of blood is *organic*, as much a part of the organ as its vascular or parenchymatous structure. All deviations from this proportion are an organic alteration, and necessarily are attended with an aberration of function. Now, the organic or vital actions, on which depend the functional phenomena, consist in molecular movements constantly existing between the molecules of the nutritive humour, or blood, and the solids. The functional phenomena, then, depend on two circumstances—1st, a definite amount of sanguine fluid in each organ; and 2d, a certain activity in the interior molecular movements of the solids and fluids of the organ. The morbid derangements of the functional phenomena connected with the circulatory movements may then be arranged in four categories or classes:—1. When the quantity of the sanguineous fluid is augmented, and the movements are *quickened*, the functional phenomena are executed with greater energy, and their disordered action is from excess—*sthenia*. 2. When the quantity is increased, and the movements are *diminished*, the functional phenomena are depressed or deteriorated—*congestion*. 3. When the amount of the organic fluid is *lessened*, and the movements are *diminished*, the functional phenomena are enfeebled, and fail, or are suspended—*asthenia*. 4. When the quantity is *deficient*, and the movements are *accelerated*, the functional phenomena are activated, though irregular—are in excess, but are speedily exhausted.

In a healthy or natural state of the organs, excessive losses of blood produce diminution of the organic, and with them, of the functional actions. This is manifested in intellectual and muscular feebleness, diminished sensibility, weakness of the circulation, lessened temperature, cessation of the secretions, and syncope. The phenomena belonging to the third category prevail.

But when an organ entering into the roll of the sympathies is the seat of an active irritation, which is not eradicated by the vascular depletion, the brain and nervous system, as the centre and organ of the sympathies, continue to experience the irradiation of this irritation, are excited, their organic actions, or the molecular movements of their organic fluid and solids, are quickened, and they are placed in the conditions of the fourth category—that is, their functional phenomena are violently disturbed, and rapidly exhausted. The functions of all the organs connected with the nervous system must, consequently, be equally disordered. Hence result the various symptoms, so often deceptive, that succeed to copious depletion, and ex-

cessive losses of fluids, which may be confounded with, and be mistaken for purely sthenic symptoms, or excess of actions attended with force or power, and demanding depletory measures.

This rationale is further illustrated by the fact, that the disturbances of the nervous phenomena, induced by sanguineous losses, are temporarily relieved by a further depletion, which reduces for a short period the cerebral excitement, though, ultimately, they are highly aggravated by the proceeding. It explains also the necessity, in the treatment of this state, of keeping in check the cerebral excitement by the application of cold and sedative means to the head, with occasionally topical depletion from the temples, or behind the ears, and revulsive excitement of the extremities, while, internally, are employed diffusible stimuli, tonics, anodynes, and an analeptic regimen.

Besides the alterations of the blood noticed, others occur, which are not as easily discerned, but may exercise very considerable influence over the circulatory phenomena. In fevers of malignant, or of the adynamic and ataxic character, the blood often is of a much darker hue than in a natural state, being but partially influenced by respiration, and its plasticity is greatly diminished. This anormal condition of the blood, it is not improbable, constitutes one of the principal phenomena of these fevers, imparting to them their peculiar characters.

Of the Vessels as affecting the Circulation.—The vessels, as a conduit between the respiratory capillaries and the pulmonary vascular parenchyma, and the nutritive and secretory capillaries and vascular parenchyma, transmitting the fluids between the two, exercise a very decisive controlling influence on the regularity of the circulation. As has already been shown, they possess no active share in the circulation, but act only from their mechanical construction and physical properties, in both which respects they are most admirably adapted for the purposes of the circulation, being the most perfect hydraulic apparatus.

The inner membrane, which is in reality the true or proper vessel, is a variety of the serous tissue; it forms alone the capillaries, and is continuous with the areolar or vascular parenchyma, the last term of the circulation, in which the fluids move in every direction. From this continuity, inflammation affecting the capillaries and parenchyma, is often extended into the vessels, and in wide-spread inflammations, occupying a large portion of the organism, the inner membrane of the vessels is found to be inflamed throughout the whole vascular system.

It occurs also in congestions of the lungs in severe bronchitis, pneumonitis, and in some cases of scarlatina maligna. From the imperfect performance of respiration, the blood loses its property of exciting the actions of the brain and nervous system generally—and a state of adynamic prostration is induced.

Inflammation of the inner membrane of the vessels, like inflammation of the serous tissues, produces effusion of plastic lymph, sometimes in considerable quantities, diminishing the caliber of the vessels, which is also, in some instances, completely obliterated. This last circumstance is of more frequent occurrence in the veins than the arteries, and occasions serious embarrassment to the circulation, when it occurs in the large venous trunks.

In the arteries the inner membrane, or true vascular coat, is strengthened by an additional coat formed of the elastic fibrous tissue. The toughness and elasticity of this tissue fits it admirably for this purpose; it resists the impulse of the systole of the heart, and, as was previously explained, by its elastic reaction, continues the momentum derived from the contraction of the ventricles. When this coat is, however, the seat of a continued irritation, as it often is, and its nutrition is impaired or perverted, its physical properties become affected. Its elasticity is diminished, it loses its capacity to resist the impulse of the heart, but yields to it, and the diameter of the vessel enlarges at the point where it gives way. When the distention happens to be considerable, a break or fissure takes place, and the external or cellular coat is extended, forming a pouch. This state constitutes the true aneurism of the arteries. The pouch is not exclusively formed of the cellular coat, for this inflaming throws out numerous layers of coagulating lymph, which assist in strengthening the tumour, and prevents, for a considerable period, its final rupture.

Considerable dilatation occurs, at times, throughout the aorta from chronic affection of the fibrous coat lessening its elasticity, though without forming aneurisms. The force of the circulation is then greatly diminished.

The arteries, in some instances, are of a caliber too contracted, and the fibrous coat too unyielding, to give a free passage to the columns of blood pushed through them, especially under the operation of excitement from exercise, or other causes. The resistance the heart experiences in the propulsion of the blood, subjects that organ to frequent derangement of its function, and generally induces, ultimately, its dilatation, or other alteration of structure. In one instance of this kind that fell under my notice in the Alms-house Infir-

mary, which terminated fatally from excessive dilatation of the ventricles, the descending aorta was not larger in diameter than the usual size of the common iliac.

The fibrous coat of the arteries is frequently denaturalized by a deposit of calcareous matter, converting it into an osseous structure. Its elasticity is entirely lost, and the vessel ceases to assist in the support of the circulation, as it can no longer react on the contained column of blood.

The cavity of the arteries is sometimes obliterated, so as to arrest entirely the passage of the blood through them. This circumstance is of more frequent occurrence in the small, than large arteries, though several cases are recorded in which it was presented in the aorta.

The middle coat of the veins is devoid of the elasticity possessed by that of the arteries. It is not necessary to their office, as they are not exposed to the impulsive action of the heart. Like the middle coat of the arteries, it is subject to softening, when it easily ruptures, and to thickening or hypertrophy, when it approaches in some respects to the fibrous tunic of the arteries.

The coats of the veins, from their distensible character, frequently yield to the pressure of the blood accumulated in them; and this circumstance is more certainly occasioned, when the middle coat has sustained a lesion by a vitiation of its nutrition, from irritation, or other cause. The enlargement of the cavities of the veins produced in this manner, is termed varices; and, lately, by BRIQUET, phlebectasia, of which various species exist. They are analogous to the true aneurism of the arteries. This state is most usual in the superficial veins of the lower extremities, though it has been met with in the veins of most portions of the body. A varicose condition of the veins proves an embarrassment to the local circulation, and gives origin often to serious local affections, ultimately deranging the general health.

The cavities of the veins are found in some instances very much contracted, and even entirely obliterated. This defect may proceed from adhesions of the internal membrane, a consequence of its inflammation, or the coagulation of the blood within the vessel. The circulation of the veins is also sometimes obstructed by the formation of considerable coagula floating loosely in the veins, or having a partial adhesion.

Pus is very commonly found in the veins in the vicinity of inflamed organs; and it is this circumstance, which modern researches would appear to demonstrate in a positive manner, that is productive

of many of those secondary disturbances, which have been idly explained as depending on constitutional irritation, sympathy, and other indefinite causes. It is an occurrence repeatedly verified as succeeding to surgical operations, fractures, and phlebotomy, and as attached to suppurations of the internal organs. It occurs with frequency in acute metritis, succeeding to accouchement, and in the affection of the lying-in termed phlegmasia alba dolens. In many instances it has been remarked, that pus is found, not only in the veins of the diseased structure, but in many other veins, in the parenchyma of the organs, substance of the muscles, and in the articulations. The pus thus distributed in numerous depots is not derived from absorption, at least uniformly. It is secreted by the inner membrane of the veins, into which the irritation of the parenchyma of the organs, with which it is continuous, has extended, and is thence carried along with the circulatory torrent, and disseminated throughout the economy.

Of the Heart as Productive of a Pathological State of the Circulation.—From the importance of the office deputed to the heart in the circulation, every departure from its normal condition, either of structure or action, is productive of more or less disorder of this function. The heart being a mechanical power established to move the blood in masses, mechanically, between the two systems of respiratory and nutritive capillaries and the parenchymatous vascular structure of the organs, is, therefore, essential to the maintenance of their circulation, on which all the vital phenomena immediately depend. Any disability of the heart is, according to its degree, productive, consequently, of disturbance of the circulatory function in its whole extent.

The variety of tissue, the complicated arrangement, and the diversified connexions of the heart with the organs of the economy, expose it to numerous sources of disease, and to frequent disturbance of its functional offices.

The perfect freedom of the heart's action, indispensable to its function in the circulation, is secured by the serous membrane—the pericardium—which envelopes it in a peculiar manner, placing the polished, smooth, and lubricated surfaces of this capsule in contact with each other.

Like other serous membranes, the pericardium is very susceptible of inflammatory irritation. When acute, the extreme sensibility this tissue acquires, produces an agony that nearly suspends the action of the heart, and places the patient in eminent jeopardy. The deterioration of its polished surface by the depositions of layers of plastic

lymph, and the cessation of its lubricating secretion, embarrass likewise the action of the heart, and entail an impairment of its function most generally fatal in its results. This membrane is, also, the seat of a serous effusion producing a morbid collection of fluid—a form of dropsy—interfering so materially with the heart in the exercise of its office, as to prove a fatal affection.

Fibrous tissue derived from the fascia superficialis, as demonstrated by the lamented GODMAN,* is combined with serous tissue in the formation of the pericardium, and renders this capsule liable to rheumatic inflammation, so frequently transferred from the articular fibrous tissues to the heart. This translation most probably is facilitated, and is explained by the connexion pointed out, a connexion more clearly elucidated by Godman, than by any preceding anatomist.

The interior lining membrane of the heart, continuous with that of the vessels, and of the same nature, is subject to the different morbid lesions indicated already as affecting it in the vessels. It is the seat of acute and chronic inflammation, of different secretions, the deposition of plastic lymph, of thickening, softening, ulceration, and induration. The action of the heart, and, consequently, the whole circulation, experience various irregularities when these defective conditions of this tissue exist. The disorders they occasion are more marked and aggravated when the valvular structure of the heart, formed of this membrane, happens to be the location of these affections. The regular play of their movements, which govern the order of the circulation, is then greatly interrupted, and the circulation is thrown into extreme disturbance.

The auriculo-ventricular valves of the left heart, and the coronary valves at the mouth of the aorta, are those most commonly affected. It is rare to find the valves in the right heart deviating from a natural state.

The substance of the heart itself is subject to various pathological modifications. Whether the muscular fibre is affected with acute inflammation, is somewhat doubtful, and it is not yet established that a true carditis does occur. Most cases considered as such, are inflammations of the pericardium, or the internal lining membrane of the heart. Approaching to an inflammatory state, are the sanguine effusions which sometimes take place into the substance of the heart, constituting a true apoplexy of that organ.

In the mode of its *nutrition*, the heart departs, like the other organs, from its natural order. Of this character is the excessive thick-

* Anatomical Investigations, by J. D. Godman, M. D.

ening of its parietes, or *hypertrophia*, without a degeneration of its structure. This condition may prevail in the whole of the heart, or be present only in a portion. The first is a rare circumstance. I have never met with an instance of it, though cases are on record. Most commonly the left ventricle exhibits the hypertrophied state. The right ventricle is seldom the seat of this lesion, and the auricles are still more rarely affected by it. I have seen but a few cases of hypertrophy of the auricles, and then it was the left that manifested this state, and was coincident with hypertrophy of the same ventricle.

Cardiac hypertrophy is a consequence, most generally, of a light sanguine irritation, simply augmenting its nutritive actions, which may be excited in various manners. I have seen hypertrophy repeatedly to succeed rheumatic attacks, which had affected the heart by metastasis. In several instances it followed on pericarditis; chronic irritation of the stomach I have known to be its exciting cause; and in one case, attended with softening both of the heart and aorta, ending in a rupture, mental anxiety, and distress appeared to have been the originating cause.

The reverse state of the heart, or its *atrophia*, occurs, but with less frequency. The walls of the heart then become thinner, and in an extreme degree, the muscular fibres disappear entirely. In a case of sudden death, I found on examination the right ventricle having the appearance and the thickness of the pericardial capsule—it was semitransparent.

The consistency of the cardiac structure undergoes changes from a vitiation of its nutrition. It exhibits at times a morbid hardness or induration, which causes it to sound when struck like thick sole-leather, and to resist the scalpel when cut. It exhibits also various degrees of softening when it acquires unusual flaccidity, and its fibres break down with slight efforts.

The capacity of the cardiac cavities presents also different anomalies which disorder the circulation. The most usual is their *dilatation* or enlargement, and occurs most frequently in the right auricle and ventricle. It affects also the left ventricle and auricle, and some instances are recorded of all the cavities having been found unnaturally enlarged.

Dilatation of the cavities may coexist with any of the preceding conditions of the heart. Thus, it is conjoined with hypertrophy or thickening—the active aneurism of *Corvisart*—with atrophy or thinning—the passive aneurism of *Corvisart*—with induration, and with softening.

Dilatation is sometimes restricted to a limited portion of a cavity, and, then, the formation of a pouch or sac of various size opening into the cavity, is a frequent result. This is analogous to the false aneurism of the arteries. I have met with only a single example of this nature. In that case the left ventricle was hypertrophied, having a pouch connected with it nearly of the size of a large hen's egg, the walls of which were also thickened, communicating with the ventricle near the apex. The existence of this pouch was suspected, and announced several months previous to the death of the patient, from the strong pulsation and impulse, detected by the stethoscope, in the left lateral region, about the fourth rib.

A common cause of dilatation is an obstruction offered to the blood in the course of the circulation, which accumulates that fluid in the heart. This sometimes arises from a morbid state of the valvular structure, sometimes from contraction in the caliber of the arteries, and sometimes from congestions in the capillaries. This last is more common and efficient as a cause of dilatation for the right, than the left cavities. From the vicinity of the pulmonary capillaries to the heart, an obstruction to the transmission of the blood through them, is immediately experienced by the right cavities, whose parietes, being feebler than those of the left, yield to the distention they experience. On this account, acute and chronic inflammations of the lungs, of the bronchial mucous membrane, and the congestions and alterations in the pulmonary structure, impeding the passage of the blood, are so frequently attended with affections of the heart, inducing derangements of its structure. Dilatation, however, sometimes occurs from causes which it is not possible to appreciate.

The capacity of the cavities is frequently diminished, to an extent, sometimes, interfering with the regularity of the circulation. This diminution may be concurrent with a natural thickness of the parietes, with their hypertrophy, their atrophy, induration, or softening. It is most common in the ventricles, and is produced at times, especially in the right, by a thickening of the interventricular septum. It also proceeds occasionally from enlargement of the columnæ carneaë. When hypertrophy is unaccompanied with dilatation, and concentrates in its progress, the cavity is necessarily contracted.

The actions of the heart are subject to be deranged from irregularities in the nervous centres with which it is in connexion. The influence of the passions is well known, but the disorders induced in the functions of the heart, emanating from the ganglionic system, are very imperfectly appreciated. From this source are produced a great variety of cardiac disorders, many of them highly distressing,

and which ultimately terminate, in some cases, if not relieved, in the production of incurable organic disease of the heart. The cardiac plexus, most probably, is the portion of the nervous organs in which the disease is located, the symptoms existing in the heart being only a functional disturbance.

To this cause are to be attributed some cases of palpitations excited by light moral impressions, by exercise, and which are spontaneously produced at certain times, while, at other periods, the action of the heart is perfectly natural. Some of those cases so loosely designated angina pectoris, in which no organic disease of the heart can be detected, are of the same character. Spasms, which unquestionably affect the heart, originate in diseases of that plexus.

A functional disorder of the heart, respecting which I have several times been consulted, appears to me to depend, also, on an affection of the nervous ganglionic centres connected with this organ. The action of the heart, in one case, suddenly became very feeble, and a species of lypothymia took place, accompanied with a sentiment of dying. In another case, the pulse gradually diminished in sleep, and finally nearly ceased, when the patient awoke in great distress with a similar deathly feeling. In both these cases not the least sign of disease of the heart could be detected by examination.

Of the Capillaries and Vascular Parenchyma, as Affecting Pathologically the Circulation.—The capillaries appear to be formed of the inner membrane, the real vascular membrane of the arteries and veins, and the lymphatics are formed of a tissue precisely similar. This membrane, constituting the vessels, is continuous with a similar membrane existing in the parenchyma of the organs, of which it composes a large portion, arranged by its numerous septa, into a cellular or areolar form.

The vascular, or circulatory system, is not, then, to be regarded as a simple arrangement of vessels, but its principal portion is an immense serous sac or bag, having prolongations or ramifications into the different organs, and divided into innumerable cells or vacuolæ, into which the vessels open—the arteries being efferent, or bringing supplies of blood, the veins and lymphatics being afferent, or returning, the one the coloured, the other the colourless portions of the blood, from the vacuolæ or cells of the vascular parenchyma. This precise arrangement of the vascular system, cannot be positively demonstrated in the general structure of the organs, though an approach to it may be observed in the mucous membranes when prepared and examined with a microscope. In the erectile tissues, as they have been named, such as the penis, clitoris, nymphæ, and nipple, and in the

spleen, especially when examined in the larger animals, as the horse and the elephant, this arrangement of the vascular system is most clearly demonstrated. The diploë of the cranial bones exhibits the same disposition of the vascular system. In these organs the structure is cavernous or spongy, the cells of which are formed by the inner membrane of the vessels, and not by common cellular tissue, as was supposed by many anatomists. The cells of the erectile tissue are, in reality, as Malpighi described them, a species of vascular sinus, or dilatation of the vessels themselves. The papillæ and villi of the mucous membranes, it is ascertained, have an analogous structure. The erectile tissue, or organs, may be regarded as exhibiting, on a magnified scale, the disposition of the vascular arrangement for the circulatory or sanguine nutritive humour in the parenchyma or intimate structure of the organism.

The circulation or movement of the blood in the erectile tissues and organs, is not restricted, it is obvious, to mere vessels. It is effused out of the vessels, properly speaking, into a cavernous, spongy, and cellular structure, whence it returns again into vessels, when its transport to other organs is required, for which purpose the vessels are provided. The movements or circulation of the blood in these tissues, is accomplished, consequently, by a force acting in the tissues themselves, and not foreign to them. When they are excited, an afflux of blood is directed to them, distending their cellular or cavernous structure, and causing the phenomenon of erection. This is analogous to, and is a species of congestion. While the excitement continues, the affluxion persists, and the excess of blood producing the erection is dissipated, or re-assumes the circulatory movement, only when the excitement is abated. Adopting the erectile tissue as the obvious type of the ultimate vascular arrangement, in its circulation is figured the circulation of the parenchyma of the organs generally. The last circulation is thus ascertained to take place in minute capillaries, and in a spongy or cellular structure of extreme tenuity, the cel- lules in the coloured tissues, probably not exceeding the size of a blood globule, and, in the white tissues, being of a still smaller size.

The foregoing preliminaries were required to understand the nature and the mode of production of the pathological conditions of the capillary and parenchymatous circulation. The capillary and vascular parenchyma contains the larger proportion of the blood, and it is the seat of the molecular movements, constituting the organic or vital actions, and, consequently, is interested, in some of its portions, in almost every pathological condition. Every where continuous and connected, the disturbances of a part, when possessing

any intensity, are felt throughout the whole; deranging the order of the circulatory actions; imparting to them irregular, fluctuating, or undulatory movements, and overthrowing the equilibrium, that, in a normal state, prevails in the distribution of the circulatory humour amongst the organs.

In the healthy or normal state, the excitement of the organs being in every portion of the organism, in an equable ratio, adapted to the structure, properties, and functions of the organs, the capillary and parenchymatous circulation is in a just equipoise. But, when an undue excitement or irritation is developed in an organ or tissue, it becomes the centre of converging and confluent movements of the capillary and parenchymatous circulation, producing an affluxion towards it, and destroying the natural equilibrium in the distribution of the sanguine nutritive and excitative humour. This fluxionary movement possesses various extent, governed by the intensity of the irritation, the ascendancy the organ affected holds in the economy, and degree of power in the other portions of the economy capable of resisting the attractive influence of the irritated centre of fluxion. When limited, the phenomena of local inflammations are present, which may be repeated by sympathy in other organs. It is thus experienced, under certain circumstances, extensively in the economy, producing congestions of different intensity, and affecting different organs. The phenomena of irritation, of inflammation, and of congestion, with their consequences, are, then, of the same order, and belong entirely to the capillary and vascular parenchyma, and the capillary and parenchymatous circulation. One feature is common to these morbid states. They are attended with unnatural accumulation of blood where developed, with corresponding diminution in remoter organs, which do not partake of those conditions, the greatest deficiency existing generally in the counterpoints to the greatest excess. Thus, when the irritation and congestion are placed in the cerebral organs, the extremities are cold from the deficiency of their circulation. In the congestions of the internal teguments, the external are pale, cold, and inexcitable. This unhinging of the capillary and parenchymatous circulation, is an essential character of the pathological state. The due adjustment of this circulation to the organs, and the stability of its libration throughout the economy, are the objects to be accomplished by therapeutic and remedial proceedings, either for a restoration to health, or for protection against disease.

The capillary and parenchymatous circulation is endowed with an excessive mobility. The affluxive movements just described, are excited, in particular instances, with extraordinary promptness, and

wide diffusion. It is this circumstance that constitutes *paroxysmal diseases*, whatever may be their phenomena or symptoms, derived from the functions of the organs affected. Simple intermittent and hectic fevers are a light form of this state, excited by feeble irritations, in which the congestive accumulation is slight, and awakens reaction, in the manner hereafter to be noticed. The reaction is a curative process, which dissipates the congestion, and diminishes, sometimes removes entirely, the primitive irritation, and, then, the paroxysm terminates, the circulatory equilibrium being restored, until renewed by the return of the local irritation.

Malignant intermittents are a more aggravated form of the same condition. The disorder of the capillary and parenchymatous circulation is more complete; the interior congestion is excessive, overwhelming the organs that are its seat, prostrating their forces, and incapacitating them, by the loss of their vitality, from producing those irradiations into the organism, constituting reaction; while the other organs, abandoned by their circulating fluid, have their actions alarmingly enfeebled, and reduced to the lowest state of exhaustion.

The transport of the capillary and parenchymatous circulation towards a point of affluxion, is often accomplished in a rapid manner, precipitating the fluids on the organ, the seat of the attractive irritation, disordering its functions, or overwhelming it with a fatal deluge. This is the movement designated by the terms *raptus* and *molimen*, by the older writers, and is often accompanied with the effusion or extravasation of blood. When the *raptus* is directed towards the tegumentary tissues, and is attended with sanguine effusion, it constitutes the various hæmorrhages, but when concentrated on organs having no exterior communications, and the effusion takes place into the common cellular tissue, or interstices of the structure, then are produced the various sanguine apoplexies.

The *raptus* of affluxion occasions in many instances merely a temporary congestion, disordering the function of the organ; but the irritation which had excited the abnormal accumulation of blood subsiding, probably by the suspension of the organic actions from the congestion itself, the blood resumes its usual course in the circulation, the congestion is dissipated, and the functions resume their natural order. When the brain is the organ the subject of this affluxive *raptus*, we have excited, if of a mild grade, the phenomena characterizing *hysteria*; or, if of a higher grade, the production of *epilepsy*.

Should the mucous membrane of the bronchial tubes be the seat of this sudden congestive flux, the turgescence that ensues blocks up the caliber of the small bronchi, and the admission of the air into

the air vesicles is interrupted or entirely prevented. Embarrassed respiration, or dyspnoea, immediately ensues as a consequence of this state, and constitutes one of the forms of *asthma*. The same state is not unfrequent in the mucous membrane of the larynx, especially covering the *cordæ vocales*, stuffing up the *rima glottidis* by the turgescence induced in the membrane. A croupy respiration and cough are speedily developed, and are supposed to be occasioned by spasm—it has been called spasmodic croup. All the excretory ducts are subject to be affected in a similar manner, and the passage of the fluids they eliminate is arrested. Acute irritation of the urethra will produce so great a turgescence of its mucous membrane, as to prevent entirely the escape of the urine, and a complete suppression is suddenly induced. This state is mistaken for spasm, and the arrest of the urine is attributed to spasmodic stricture. The same occurs in the ureters, and in the ductus choledochus in acute duodenitis, and the symptoms are attributed to the passage of renal calculi, and of gall-stones.

In all congestive and paroxysmal diseases, their essential character consists in this unhinging of the whole capillary and parenchymatous circulation, and its concentration on the organ, the seat of the perturbing irritation. The treatment of these diseases must be made to repose on this basis. Its object will be, 1st, to impart force and stability to the actions of the general capillary and parenchymatous structure and circulation; and, 2d, to diminish or eradicate the local irritation, the first moving power creating the disturbance. If we cannot succeed immediately in the last object, the attainment of the first will be sufficient to arrest the paroxysmal type. This measure is accomplished by the administration of cinchona, or its preparations, of the various tonics, and other means that produce a permanent excitement of the capillary and parenchymatous circulation, or their introduction into the organism by endermic medication, which is to be preferred whenever the stomach is in an irritated state. It is this operation of cinchona that renders it so effectual in all paroxysmal diseases, and which have led some to attribute to it a specific property of anti-periodicity.

Inflammatory irritation, or phlogosis, is located in this same structure, and is a modification of the capillary and parenchymatous circulation. The molecular movements constituting the organic or nutritive actions, are accelerated, or acquire an augmented activity. The vitality of the inflamed part is elevated—its irritability, its sensibility, its temperature are increased. The quantity of circulating or sanguine nutritive humour in the phlogosed part is more abundant than natural, but its accumulation is never sudden, as in congestion,

it occurs more gradually, and may continue, if not too intense, for a considerable period without inducing the suspension of the organic actions, as in congestion. Being a modification of the nutritive or organic actions, it is always productive of some change in the structure or secretions of the organ or tissue in which it occurs.

The disturbances of the circulatory functions in inflammatory irritation, are of a different character from those observed in congestive irritation. From the increase of irritability and sensibility attending it, an inflamed organ becomes a centre of irradiation, whence is transmitted into the organs eminent in the sympathies, the same order of actions—the same mode of being or condition. The heart, from the intimacy of its connexions, so frequently partaking of this state, the inflammations of the viscera, and of most other local inflammations, are productive of an acceleration of the vascular circulation, and generally of increase of its force. In congestion, the vessels being emptied by the disorder of the capillary movements, and by the detention of the blood in the parenchymatous structure, the action of the heart is diminished, and the vascular circulation is enfeebled. Inflammatory irritation when active, is, consequently, seldom confined to a single viscus; a constant disposition exists for its propagation; and most usually, when excited in any viscus, it is transmitted to several others. This circumstance modifies the influence of phlogosis or inflammation over the circulatory movements. The participation of the heart in this state, quickens and enforces the vascular circulation; the coadunition of distinct organs in this condition, multiplies the points of affluxion, counterpoising each other, and preventing the excessive accumulation on one, as occurs in congestive irritation. Inflammatory irritation is thus diffusive in its character, is excitative and perturbing of the organic actions, is not attended, in its acute stage, with a disturbance of the equilibrium of the capillary and parenchymatous circulation, to the same extent, as prevails in congestion. Although the phenomena of congestion do not occur to the same extent, and as rapidly in inflammation, as in simple congestive irritation, it becomes ultimately established when the phlogosis continues in the acute form, and when it affects highly vascular organs or tissues, is productive of the same adverse states of the capillary and parenchymatous circulation in different regions of the organism.

In treating of the pulse, in the preceding Number of this Journal, the manner in which pathological states of the capillary and parenchymatous circulation modified the general vascular circulation was then described, and a repetition is here unnecessary.

ART. XII. *Remarks on the Climate and Diseases of Batavia, and on the Means of guarding against them.* By GEORGE S. BETTNER, M. D. of North Carolina.

THE situation and climate of Batavia, are so well known, that very little is required to be said concerning them. Situated in the latitude of 6° south, Batavia is constantly exposed to the burning influence of an equatorial sun, and the heat would always be excessive, were it not moderated by being in the vicinity of mountains, which, in a clear atmosphere, may be distinctly seen at the distance of thirty or forty miles south of the city. The range of the thermometer is thought to be somewhat under 90°; and it is always warmer during the easterly, than during the westerly monsoon.

The harbour of Batavia being formed by a very deep bay, and encircled in front by a number of small islands, possesses many advantages for the security of the shipping. But the circumstances which contribute to the safety of the vessels, are far from being favourable to the health of their crews.

The islands in front of the harbour, (many of which are used only as cemeteries, and are filled with the bones of unfortunate foreigners,) obstruct in a great measure the free passage of the sea breeze, and together with the depth of the bay contribute to the stillness of the water in the roads, which sometimes appears thick and partly stagnant, imparting at the same time, an unpleasant and unwholesome odour. And when it is recollected that this atmosphere receives still further contributions from the canals of the city, and the surrounding marshes and jungles, it will not be considered a matter of surprise, that so many have sickened and died in this climate.

With regard to the canals in and about Batavia, the general impression is, that they furnish a striking instance of mistaken attachment, in a foreign country, to what we have been accustomed to in our own; and the Dutch have been charged with the folly of cutting their canals with as much freedom under the equator, as they would do in Holland.

Although in a medical point of view, it must be confessed, that the canals contribute materially to the humidity of the atmosphere, yet something must be said in their vindication. The inhabitants are universally in favour of them, and would rather multiply than diminish them. They furnish a free and expeditious means of transportation, and a means pleasant too, in a warm climate, compared with conveyances by means of horses. The canals are, moreover,

far from being stagnant. The Bitenzod river which supplies them, comes from the mountains with considerable velocity, and preserves the water constantly in motion. But the greatest utility of the canals, is derived from their furnishing an abundance of water for the purpose of bathing, whilst many which are not applied to this use, and some too that are, yield an ample supply of excellent water for drinking.

The country around Batavia, along the sea-coast, presents a considerable resemblance to the low land which is seen in approaching our own coast, especially that of the southern states. On each side of the large canal, which receives the smaller ones, and discharges itself into the harbour, are extensive marshes and jungles, presenting much the appearance of the marshes, which are seen more particularly at the embouchures of the rivers in the southern states.

This flat and level condition of the country, does not continue very far; at the distance even of eight or ten miles from Batavia, the land begins to present an undulating surface, and still further, it is diversified with hills and valleys, and at the distance of thirty miles south of Batavia, you approach the mountains and high land which extends through the island, from the noble bluff called Java Head. The influence of the mountain air, over the close and sultry atmosphere of Batavia is very obvious, and it is on this account, that, notwithstanding the heat of the day, the nights are always pleasant and refreshing at Weltevreden, Rysmik, and Panaabang, where the Europeans reside, at the distance of four or five miles from Batavia. The nights, although pleasant and refreshing at those places, are generally sultry and oppressive in Batavia, and in the roads; and this circumstance is unfavourable to those who have to pass their nights on shipboard.

As respects the city of Batavia itself, no European thinks of spending the night there.

These prefatory remarks would seem to be altogether inexcusable with regard to any place less celebrated than Batavia, but in conjunction with others subsequently to be made, they will perhaps be considered admissible, especially with those whose business may lead them to Batavia, and who would wish previously to be possessed of information with regard to its situation, and to be able to estimate in some measure the danger to which their health must be exposed.

The ship *Mary*, of Philadelphia, to which I was attached as physician, anchored in the roads of Batavia, October 8th, 1828.

It will be seen by the readers of Dr. Johnson's work on Tropical

Climates, that the British squadron, in the year 1800, amongst which there was such great mortality, arrived at Batavia on the 21st day of this same month. The knowledge of this fact was calculated to excite in us some concern, and led us to prepare our minds for the appearance of sickness. Although Batavia, from its situation, cannot be said to have any season that is healthy, yet the changing months, as they are called, that is, October and April, are regarded as the most sickly. From October to April is the rainy season, in which prevails the westerly monsoon. This season is the most dreaded by foreigners, and is perhaps more pernicious to them, particularly seamen, in consequence of their exposure to the alternations of the rain and sun.

But the inhabitants generally suppose the dry season of the easterly monsoon the most dangerous, and think that the excessive heat of the sun, sometimes unabated scarcely by a shower for weeks together, is favourable to the production of fevers.

If, however, there be any difference, the latter, or dry season, is perhaps more frequently called the healthy, and the other the unhealthy season. The first day we anchored at Batavia, a case of fever, but not considered violent, presented itself in the person of the first mate of the ship. His case is as follows.

D. Coupland, first mate, has been complaining for the last two days whilst coming up the straits of Sunda.

Symptoms to-day, *October 8th.* Nausea; epigastrium tender; pain in forehead across the eyes; pulse quick, and somewhat hard; throat sore; bitter taste in mouth; bowels constipated for the last three days; skin dry; tongue furred, yellow in the middle, but clean on the edges; spirits dejected. Ordered, *R. Hydrar. submur. gr. xii. in pillulis; oil two hours after; chicken water in the afternoon.*

9th. Medicine operated well; has very little pain in the head; tongue nearly the same; feels heavy; rested tolerably well during the night; no bitter taste in mouth; throat not so sore; bowels open. Is directed to-day merely to attend to his diet, and to avoid the sun.

10th. No pain in head; bowels open; skin still dry; tongue more natural, but still furred. Ordered, *R. Colomel, gr. ss.; pulv. opii, gr. ss.; M. ft. pill. una q. b. h.*

11th. Tongue looks well, almost entirely clean; urine high-coloured, and scalding; bowels open; stools greenish colour; no appetite; feels occasionally fainting spells; complains of debility and thirst; head free of pain. Continues to take the pills, and to attend to his diet.

12th. Feels weak; skin a little moist for the first time. Pills continued. Has no appetite; bowels regular; mouth a little sore. Evening. Gentle perspiration over his body; gums tender. Pills continued yet.

This man became convalescent, and was nearly restored, when a relapse was occasioned by neglect of diet, and his imprudence in eating fruit, which brought on a violent colic. This was relieved by the usual remedies, and his treatment was conducted as before. He got entirely well.

This case was not considered dangerous from the symptoms, and from the circumstance of its having occurred so soon. The pain across the eyes was not so acute as in some of the cases which occurred subsequently, nor was the tenderness of the epigastrium so great. On this account no depletion whatever was thought necessary. The dose of calomel was intended to obviate the constipation, and the pills were afterwards employed with a view to act upon the capillary circulation, the skin being very dry and torpid, and the patient being in the habit of perspiring a great deal. These ends were fully answered.

It may perhaps be worth mentioning, that this first case occurred in a man who was then for the seventh time at Batavia, and having been sick there before, he had vainly made a boast of his security against the effects of the climate.

The next cases which occurred were affections of the bowels.

October 26th. I was called to a seaman named Gates, who, whilst working in the hold, suddenly fainted and fell. He was soon restored to his senses, when he stated that the night previous and during the day, he had been the subject of an active diarrhœa. It was plain therefore that his having fainted was from working in a warm place in his debilitated condition. On examination of his symptoms he had no pain in his head, or at the epigastrium, and his tongue appeared almost natural. This man was put on diet, and was ordered a few powders of prepared chalk and opium, and was able to resume his work on the third day from his attack. This was the only case which came under my notice where astringents were employed or even thought admissible. When the epigastrium and the bowels manifest tenderness, and the tongue is much furred, or is red, astringents will always be pernicious.

Thousands of seamen at Batavia have wrought their own destruction, by unadvisedly using for diarrhœa and dysentery, strong decoctions of the rind of the mangustine and the pompomoose or pomelo, which are the most powerful of all astringents.

Equally pernicious was the plan of Dr. BANCROFT and others some years ago, which consisted in giving copious quantities of the Peruvian bark to cure inflammation of the viscera, and these quantities often increased in proportion to the oppressed and languishing condition of the patient. Whilst at Batavia, I was informed of one American ship there several years ago, on board of which this plan was adopted, with the loss of every man who was taken sick, and this number by no means small. Victim after victim was sacrificed, whilst reason and conscience remained undisturbed in their repose under the authority of a name.

Besides the facts in Dr. Johnson's able work detailed against the error of this practice, the accumulated proofs of additional experience will constantly be recorded against it.

The next case which occurred was one of dysentery, in a seaman by the name of Sears. This, as did also all the other cases which I saw of this complaint, commenced in the form of diarrhoea; and it is only when it is neglected, or when it continues for some time, that it assumes the shape of dysentery. Those who are familiar with the appearances post mortem of such as die of dysentery, must recollect that the small as well as the large intestines are implicated in the disease, and that the effects of inflammation and often of ulceration, are visible along the whole alimentary canal. But besides this, the connexion of the dysentery in the East Indies, with the functions of the liver, must never be kept out of view.

This man was treated with small doses of calomel and opium, often repeated, and was restricted to diet. After salivation he became convalescent, but relapsed in consequence of deviation from his diet, and perhaps from the salivation not having been continued sufficiently long.

In speaking of dysentery, Dr. Johnson gives a useful caution, which ought to be kept in mind; which is, that the salivation ought never to be checked too soon. Should it however be carried so far, that ulcers appear on the tongue and mouth, it will be necessary to attend to them, and nothing I found so useful as a solution of the sulphate of copper. Having relapsed, this man had the same treatment repeated, and by his stubbornness and imprudence he continued to tamper with himself until even a fourth relapse. He remained on the sick list for six weeks after we left Batavia, became much emaciated, and was at last only cured by the use of calomel and opium, and an absolute restriction to cungee water and rice for weeks.

No depletion was used in this case; cupping would have been use-

ful on his first attack, but circumstances prevented its being employed.

Soon after the attack of this man, a case of pleurisy presented itself in the person of the carpenter of the ship, who in America had suffered from that disease two or three times.

I did not expect to see that disease at Batavia, where exposure to cold more frequently affects the bowels. I however saw one case of it afterwards at Panaabang, a short distance from Batavia. The practitioners there, who are averse to the use of venesection, treat this disease by leeching, together with liniments or vesication. The carpenter of the ship was bled, and with benefit, for he soon recovered. Although I should not hesitate to use venesection for pleurisy, yet, for reasons afterwards to be stated, I should prefer the use of local depletion in the cases of fever.

We had now been at Batavia about thirty days, and no case of fever had appeared since that of the first mate. Very soon, however, the cook and steward, both blacks, were attacked, and the latter with considerable violence. His eyes appeared turgid and injected; very acute pain across the frontal bones, and peculiarly distressing pain in the epigastric region, attended with prostration of strength, and incessant retching and vomiting. The other case was not so severe. These were the only two cases which occurred whilst we were in the roads of Batavia, and they both recovered. As these two cases so nearly resembled two others which occurred in the Straits of Sunda, after leaving Batavia, as well in the symptoms as in the treatment, it will be sufficient to give some account of the two last, in which the whole will be comprised.

We left Batavia, November 17th, at which time the westerly monsoon had set in, with strong winds and heavy rain. At this season it is always difficult to clear the straits, and weeks are consumed in sailing the distance for which a few days only would be sufficient. The fatigue which a ship's crew have to encounter under such circumstances, labouring under the relaxation and debility produced by their stay in Batavia, is almost sure to occasion sickness. Accordingly, whilst in the straits, the carpenter, (who had now recovered from his pleurisy,) and one of the seamen, were both attacked with fever under similar circumstances, and on the same day. The case of the seaman is as follows.

Peter —, age about thirty-five, stout and plethoric. Taken sick early in the morning of November 24th; was seized with a severe chill.

Symptoms at 9 o'clock. Severe pain of forehead across the eyes;
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pain at stomach and back; vomiting; pulse active, quick, frequent, and strong; bowels were not bound, but had been open on the night of his attack; tongue furred, white, and frothy; face and eyes turgid; vision quite dim; debility very great.

Treatment.—I immediately cupped him freely on the head and on the epigastric and iliac regions; and then administered, R. Calomel, gr. xx.; pulv. opii, gr. ss. M. ft. pulv. This did not remain long on his stomach, and was shortly afterwards repeated in the form of bolus; this was likewise rejected. 12 o'clock. Has thrown considerable quantities of greenish-coloured fluid off his stomach; skin hot and dry; frequent slight chills; alternations of heat and cold; says his sensations are very uncomfortable, and he betrays much anxiety of countenance. Ordered now, R. Pulv. sodaic. una p. r. n.; cooling applications to his stomach—when he experiences no chilly sensations, and to take, R. Calomel, gr. i.; pulv. opii, gr. $\frac{1}{2}$. M. ft. pill. una circa q. b. h. After taking one or two powders, stomach became more composed; a dose of calomel was then given. Night. Bowels well opened early in the evening, and stomach is now entirely quiet. His drink now and during the day, gum water made quite thick. The same drink ordered during the night, and R. Calomel, \mathfrak{z} i.; pulv. opii, gr. xv. M. ft. pill. lx. una q. b. h.

25th. Feels better; no pain or sickness at stomach; bowels well opened during the night; has still some pain in the head, for which he is ordered again to be cupped. Pills continued, and nothing allowed but gum water. Evening. Better; no pain; free of fever; tongue clean on the edges, slightly furred in the middle.

26th. Improving; on diet; takes the pills yet; still free of pain and fever; pulse and skin natural.

27th. Diet.

This man continued to improve, and he, as well as the carpenter, entirely recovered. In the case of the seaman, the mercury was not extended to salivation; in that of the carpenter it was. Salivation I should not consider so indispensably necessary in the fevers as in the dysentery. The condition of the skin, however, is the safest guide; and when the capillary action of the surface is fully restored and established, and the other symptoms furnish a corresponding degree of improvement, there cannot be any use in the continuance of the mercury. As the salivation is, however, easily controlled, it will sometimes prove of service by restraining the patient from the use of forbidden and injurious articles of diet. With a pulse, such as described in the case above, the question might be asked, if venesection would not be admissible? In such cases Dr. Johnson has given

the weight of his authority in favour of it, but I felt disposed to place my dependance in local depletion, from the advantage of attacking the disease in the very places where it was seated, and from the consideration of the warmth of the climate, the effects of which are much increased on board of our merchant ships, where the accommodations for the sick are for the most part very imperfect.

It should be borne in mind, that the local depletion, whether by cups or leeches, should be effectually performed; and this measure may be pursued with more firmness in consequence of venesection not being employed. Should the symptoms not give way, the cupping or leeching must be repeated.

I have reason to believe that this is the surest method of preventing those unpleasant symptoms which speedily occur in this fever, such as violent delirium, with an alteration of the pulse, and that description of tongue which is seen in the malignant typhoid fevers.

I have mentioned before, that the dysentery of Batavia, so far as I had an opportunity of noticing, commenced in the form of diarrhœa. A case which occurred of this complaint has not been mentioned.

Henry Maines, seaman, whilst at Batavia, was attacked with diarrhœa, and although he would not declare himself sick, it was evident, from his altered appearance, that he was the subject of some disease. He resisted the friendly admonition to submit to medical treatment, and continued the prey of his disease for six weeks after we left Batavia, until at last, in the performance of his duty, he fell on the deck, declaring his inability to work. In this hopeless condition, his symptoms were those of a violent dysentery, with frequent and painful tormina and tenesmus, the dejections being very small, and consisting of blood and mucus; debility and emaciation great; tongue red; and the skin dry and torpid.

The weakened state of this man would not allow of any depletion. A scruple dose of calomel was given him in the morning, and repeated at noon and at night, without producing any inconvenience, and his bowels were opened the next day with comparative ease. The calomel could not be assisted with oil, in consequence of the weakness of his stomach, and his aversion to that medicine. Pills of calomel were afterwards given, and continued until salivation made its appearance on the third day. At the same time he was directed to apply the following liniment freely to epigastrium and abdomen. R. Ung. hydrarg. mit. ʒij.; spt. nit. dul., ʒi.; tr. opii, ʒi.; ol. olivar, ʒij.; lin. sapon. camph., ʒij.; M. This man after the salivation felt evidently better; the tormina abated; the stools became at first of a greenish colour mixed with mucus, afterwards they were

dark and fœtid, and at last entirely natural. His diet was mucilaginous, and his cure was promoted by his wearing flannel next to his skin.

An outline has now been presented of the principal cases of sickness which occurred on board the *Mary*. It will be seen that the treatment pursued, was prompt, and when occasion required, active, and that in all the cases it was successful. As regards the fever of Batavia, the testimony of every one's experience is in favour of the adoption of such a course, and the success of the practitioner, will depend considerably upon the opportunity he has of applying his remedial measures at once. The pathology of the fever, and of the dysentery, are now thoroughly understood, and the safest plan seems to be, to encounter them with vigour in those parts of the system which they are known to assail. As this is the principal object to be kept in view, all the auxiliary measures which will contribute to its success, will of course be adopted.

It is generally believed that sickness does not attack strangers so soon in the East, as in the West Indies, and that the danger to which health is exposed, is in proportion to the stay in those climates. This fact seems to be well established in regard to Calcutta, Ceylon, and some other places. But in Batavia very little dependance is placed on such a probable immunity, and strangers from their first arrival, generally place themselves on their guard against the attack of sickness.

To be actuated whilst there by great apprehensions of the climate, would be very imprudent; but some persons have been known in consequence of this, to take small portions of calomel every day whilst there, a practice of which Dr. Johnson speaks in his work. It is a favourable circumstance to those who go to Batavia, that they are in some measure prepared for the climate by sailing so much within the tropics in performing the voyage.

The city of Batavia is not, and never can be healthy; and a stranger should only remain in it, during those hours of the day, when it is considered safe. By residing at Weltevreden, or Ryswick, in the country, there will be but little exposure to sickness. If on board the ship, or between the ship and the shore, the danger will be greater, as it is not so healthy in the roads, and there must be exposure in passing from the ship to the landing place, through the harbour and a long canal.

The best time for landing is about 11 o'clock, after the sea breeze sets in.

In the morning, the city of Batavia is generally enveloped in a

fog, and might be said not to be prepared to receive visiters early in the day.

As respects a restriction to diet, it will be found difficult to pursue any measure of this kind, with much uniformity. A reference to the customary mode of living in regard to the use of wine and food, should be made, and this with the exercise of moderation in all things, will generally be found sufficient.

Some captains, who by repeated voyages to Batavia, have acquired much experience of the climate, observe that the seamen on board the ship become much relaxed and debilitated, and more liable to sickness, by the entire use of fresh provisions; and think that the health of their crews is better preserved by giving them salt provisions, two or three times a week, or every other day.

This fact is of some importance, and seems to be founded in reason.

It would be very easy to show, that the sickness and mortality at Batavia, among strangers, are in proportion to the imprudence of their conduct, in neglecting the proper measures of temperance and of diet, and exposing themselves injudiciously to the effects of the climate.

On account of the heat at Batavia, no person, except the natives, thinks of walking any great distance, and it is the universal practice of the Europeans to ride. The heat of the day will not admit of much riding for the sake of recreation, and having passed the day, therefore, either in business or retirement, they sally forth in the refreshing air of the night, to perform their visits, or to search for amusement.

This riding at night, which strangers are tempted to do, is not safe or prudent. The dews of the night, as well as the heat of the sun, should both be avoided, for they are indeed "the pestilence which walketh in darkness, and the destruction which wasteth at noonday."

In a warm climate, like that of Batavia, the utility of bathing will suggest itself to the mind of every one, and a stranger there will be struck with the singular appearance of the Malays, male and female, old and young, who are constantly bathing in the canals from morning till night. A regard to comfort, as well as health, will induce every stranger to attend to this practice.

As a general rule, the European residents at Batavia sustain a much longer life than the native inhabitants, and this may be attributed to their possessing originally greater vigour of constitution, and from their having within reach those comforts and conveniences, which are the best defences against the climate, such as suitable

dwellings, the proper kind of apparel, and the advantage of riding instead of walking.

The Malays and Javanese, on the contrary, have miserable shelters, and except their breech cloth, go entirely naked, and instead of clothes, dress their bodies over with coco-nut oil.

Their diet is remarkably meagre and abstemious, and with the exception of those who are employed as servants in the European houses, they eat no animal food, living entirely upon rice, with fruits and vegetables. Most of the Europeans act upon the other extreme, using the most stimulating viands, high-seasoned curries, and beer, gin, and wine in abundance. "In medio tutissimus." A circumstance not sufficiently attended to by strangers at Batavia, is eating whilst they are heated, a practice which is very injurious. The least exertion is fatiguing and oppressive, and the residents there, previously to dinner, which is their principal meal, and taken after the business of the day is over, are in the habit of resting themselves, dressing and becoming cool, and refreshed before they sit at the table.

An attention to apparel is as useful as that of diet, and the use of cotton shirts and banyans will be found the most suitable and the most pleasant. No one there thinks of wearing linen.

With respect to a person who acts in the capacity of physician on board of a ship, his concern for the health of the crew, will be as great as his anxiety with regard to himself. Much good may be accomplished by him in exercising some inspection over the sailors, who are the most reckless and thoughtless of all beings; and enjoining upon them measures of prudence, in order to avoid sickness; and in case of disease, considerable difficulty will be experienced, and much vigilance required in restraining them to a proper diet.

In warm climates, like that of Batavia, the treatment of ulcers, should they occur, has always been found difficult and troublesome. The same remark is applicable to the treatment of syphilitic affections, and there is perhaps no part of the world where such ravages are committed by the venereal disease as at Batavia. The habits of the people are voluptuous and sensual, and the heat of the climate, which inflames their passions, augments the mischief which the indulgence often entails upon them.

Animals there seem to be equally as much affected as men by this disease, and I have often seen sheep, dogs, as well as horses, (which are never castrated there,) with all the symptoms and suffering of confirmed syphilis. The disease must be brought upon them, by their inability to attend to habits of cleanliness, to which every body in that country is extremely attentive. The Malays and Javanese have

an additional security in the practice of circumcision, to which they all conform, a practice enjoined upon them by their religious faith, and established originally, without doubt, for salutary purposes; and it is curious to see how it is sanctioned by, and interwoven with, nearly all the religions of the east.

ART. XIII. *Case of Perforation of the Stomach by Ulceration.* By
Dr. LEVI RAWSON, of Grafton, Mass.

RICHARD GIBBS, an Englishman, a dyer by trade, aged thirty-six years, came to this country in 1823; had enjoyed uninterrupted health till about a year since; was of a hale, robust constitution; temperate in the use of ardent spirits, but rather a large eater; had been a hard labouring man, and lived well.

January 1st, 1830, first called on me for advice; said he had not been so well as usual for several months past; had been troubled with nausea and pain in the left hypochondrium; frequently vomited his food, which was apt to distress him; complained of coldness of his extremities; pain in his right shoulder, and the right side of his neck, face, and head; his bowels were costive and flatulent; stools dark-coloured; appetite fastidious; countenance pallid; pulse small and weak; system generally debilitated. I gave him ten grains of ipecacuanha and twenty of calomel, and ordered spare diet. Next day I saw him, medicine had operated well, and he felt much relieved. As he complained of some pain in his stomach and bowels, I ordered him ten grains of Dover's powder night and morning, a continuance of light diet, and a rhubarb pill every night on going to bed. In a few days he resumed his work, but either from irregularity of diet, or from taking cold, he was frequently during the winter, for a few days at a time, unable to work. He kept along in this way, working a few days, then being sick a few, till about the middle of February, when he was prevailed on to leave off labouring entirely, till he had obtained his usual health and strength. By the use occasionally of a few grains of ipecacuanha, a laxative pill, and small doses of Dover's powder, he had to all appearance, by the first of April, regained his former health, and he again commenced his labour—every symptom of disease had left him, except an unusual coldness of his feet and calf of his legs—he would frequently complain of the coldness of them as being almost insufferable when they felt to me extremely warm.

14th of May I saw him; said he had taken cold the day before; felt sick at stomach; fæces dark-coloured; bowels flatulent; wished for a little ipecacuanha to take at night. The next day he felt better.